

What is claimed is:

( 1. A semiconductor device comprising a semiconductor layer formed on an insulating surface, an insulating film formed on said semiconductor layer, and a gate electrode formed on said insulating film,

wherein said gate electrode has a lamination structure in which a first conductive layer with a first width is a lower layer and a second conductive layer with a second width narrower than said first width is an upper layer, and

wherein said semiconductor layer has a channel forming region which is overlapped with said second conductive layer, a pair of low concentration impurity regions which is partially overlapped with said first conductive layer, and a source region and a drain region which are comprised of high concentration impurity regions.

2. A semiconductor device according to claim 1, wherein said pair of low concentration impurity regions are located between said channel forming region and said source region and between said channel forming region and said drain region.

3. A semiconductor device according to claim 1, wherein an end portion of said first conductive layer has a taper shape.

4. A semiconductor device according to claim 1, wherein an end portion of said first conductive layer is located between said channel forming region and said source region or between said channel forming region and said drain region, through said insulating film.

5. A semiconductor device according to claim 1, wherein a film thickness of a region of said insulating film which is overlapped with said pair of low concentration impurity regions becomes thinner as a distance from the channel region is larger.

6. A semiconductor device according to claim 1 wherein said semiconductor device is a liquid crystal display device.

7. A semiconductor device according to claim 1 wherein the semiconductor device is an electro luminescence display device.

8. A semiconductor device according to claim 1 wherein said semiconductor device is one selected from the group consisting of a video camera, a digital camera, a projector, a goggle type display, a car navigation system, a personal computer, a portable information terminal, a digital video disk player, and an electronic game device.

Sub B1 9. A method of manufacturing a semiconductor device comprising steps of:  
forming a semiconductor layer on an insulating surface;  
forming an insulating film on said semiconductor layer;  
forming a first electrode comprising a laminate structure of a first conductive layer with a first width and a second conductive layer on said insulating film;  
adding an impurity element to said semiconductor layer using said first electrode as a mask to form a high concentration impurity region;  
etching said second conductive layer to form a second electrode comprising a laminate structure of the first conductive layer with said first width and said second conductive

layer with a second width;

adding the impurity element to said semiconductor layer using said second conductive layer as a mask to form a low concentration impurity region; and

etching said first conductive layer to form a third electrode comprising a laminate structure of said first conductive layer with a third width and said second conductive layer with said second width.

10. A manufacturing method according to claim 9, wherein said second width is narrower than said first width.

11. A manufacturing method according to claim 9, wherein said third width is narrower than said first width and wider than said second width.

12. A manufacturing method according to claim 9, wherein said impurity element is an impurity element for imparting one of a n-type conductivity and a p-type conductivity to said semiconductor layer.

13. A manufacturing method according to claim 9, wherein a taper angle in an end portion of said first conductive layer is larger than that in an end portion of said second conductive layer in said first electrode.

14. A manufacturing method according to claim 9, wherein a taper angle in an end portion of said first conductive layer is smaller than that in an end portion of said second conductive layer in said second electrode.

15. A manufacturing method according to claim 9, wherein a taper angle of said first conductive layer in said third electrode is equal to that of said first conductive layer in said second electrode.

16. A manufacturing method according to claim 9, for forming said first electrode, comprising steps of:

laminating a first conductive film and a second conductive film on said insulating film;

a first etching process which is performed for said second conductive film;

and

a second etching process which is performed for said first conductive film to form said first electrode.

17. A manufacturing method according to claim 9, wherein said insulating film is removed to expose a portion of said high concentration impurity region simultaneously in forming said third electrode.

Sub B2 18. A method of manufacturing a semiconductor device comprising steps of:

forming a semiconductor layer on an insulating surface;

forming an insulating film on said semiconductor layer;

forming a first electrode comprising a laminate structure of a first conductive layer with a first width and a second conductive layer on said insulating film;

etching said second conductive layer to form a second electrode comprising a laminate structure of said first conductive layer with said first width and said second conductive

layer with a second width;

adding an impurity element to said semiconductor layer using said second electrode as a mask to form a high concentration impurity region;

adding said impurity element to said semiconductor layer through said first conductive layer using the second conductive layer as a mask to form a low concentration impurity region; and

etching said first conductive layer to form a third electrode comprising a laminate structure of said first conductive layer with a third width and said second conductive layer with said second width.

19. A method of manufacturing a semiconductor device comprising steps of:

forming a semiconductor layer on an insulating surface;

forming an insulating film on said semiconductor layer;

forming a first electrode comprising a laminate structure of a first conductive layer with a first width and a second conductive layer on said insulating film;

etching said second conductive layer to form a second electrode comprising a laminate structure of said first conductive layer with said first width and said second conductive layer with a second width;

adding an impurity element to said semiconductor layer using said second conductive layer as a mask to form a low concentration impurity region and a high concentration impurity region; and

etching said first conductive layer to form a third electrode comprising a laminate structure of said first conductive layer with a third width and said second conductive layer with said second width.

20. A manufacturing method according to claim 18, wherein said second width is narrower than said first width.

21. A manufacturing method according to claim 19, wherein said second width is narrower than said first width.

22. A manufacturing method according to claim 18, wherein said third width is narrower than said first width and wider than said second width.

23. A manufacturing method according to claim 19, wherein said third width is narrower than said first width and wider than said second width.

24. A manufacturing method according to claim 18, wherein said impurity element is an impurity element for imparting one of a n-type conductivity and a p-type conductivity to said semiconductor layer.

25. A manufacturing method according to claim 19, wherein said impurity element is an impurity element for imparting one of a n-type conductivity and a p-type conductivity to said semiconductor layer.

26. A manufacturing method according to claim 18, for forming said first electrode, comprising steps of:

laminating a first conductive film and a second conductive film on said insulating film;

a first etching process which is performed for said second conductive film;  
and

a second etching process which is performed for said first conductive film to  
form said first electrode.

27. A manufacturing method according to claim 19, for forming said first electrode,  
comprising steps of:

laminating a first conductive film and a second conductive film on said  
insulating film;

a first etching process which is performed for said second conductive film;  
and

a second etching process which is performed for said first conductive film to  
form said first electrode.

28. A method of manufacturing a semiconductor device comprising steps of:

forming a semiconductor layer on an insulating surface;  
forming an insulating film on said semiconductor layer;  
laminating a first conductive film and a second conductive film on said  
insulating film;

forming a second conductive layer with a first width;  
adding an impurity element to said semiconductor layer using said second  
conductive layer with said first width as a mask to form a high concentration impurity region;

etching said first conductive film to form a first electrode comprising a laminate  
structure of said first conductive layer with a second width and said second conductive layer with

a third width;

etching said second conductive layer to form a second electrode comprising a laminate structure of said first conductive layer with said second width and said second conductive layer with a fourth width;

adding said impurity element to said semiconductor layer through said first conductive layer using said second conductive layer with said fourth width as a mask to form a low concentration impurity region; and

etching said first conductive layer to form a third electrode comprising a laminate structure of said first conductive layer with a fifth width and said second conductive layer with said fourth width.

29. A manufacturing method according to claim 9, after the formation of said third electrode, further comprising steps of:

forming a first interlayer insulating film for covering said third electrode;

performing a first heat treatment for activating said impurity element in said semiconductor layer;

forming a second interlayer insulating film for covering said first interlayer insulating film; and

performing a second heat treatment with a lower temperature than that in said first heat treatment after said second interlayer insulating film is formed.

30. A manufacturing method according to claim 18, after the formation of said third electrode, further comprising steps of:

forming a first interlayer insulating film for covering said third electrode;



performing a first heat treatment for activating said impurity element in said semiconductor layer;

forming a second interlayer insulating film for covering said first interlayer insulating film; and

performing a second heat treatment with a lower temperature than that in said first heat treatment after said second interlayer insulating film is formed.

31. A manufacturing method according to claim 19, after the formation of said third electrode, further comprising steps of:

forming a first interlayer insulating film for covering said third electrode;

performing a first heat treatment for activating said impurity element in said semiconductor layer;

forming a second interlayer insulating film for covering said first interlayer insulating film; and

performing a second heat treatment with a lower temperature than that in said first heat treatment after said second interlayer insulating film is formed.

32. A manufacturing method according to claim 28, after the formation of said third electrode, further comprising steps of:

forming a first interlayer insulating film for covering said third electrode;

performing a first heat treatment for activating said impurity element in said semiconductor layer;

forming a second interlayer insulating film for covering said first interlayer insulating film; and

performing a second heat treatment with a lower temperature than that in said first heat treatment after said second interlayer insulating film is formed.

33. A method of manufacturing a semiconductor device comprising steps of:

forming a semiconductor layer on an insulating surface;  
forming an insulating film on said semiconductor layer;  
laminating a first conductive film and a second conductive film on said insulating film;  
forming a second conductive layer with a first width;  
adding an impurity element to said semiconductor layer using said second conductive layer with said first width as a mask to form a high concentration impurity region;  
etching said second conductive layer to form said second conductive layer with a second width;  
adding an impurity element to said semiconductor layer through said first conductive film using said second conductive layer with said second width as a mask to form a low concentration impurity region; and  
etching said first conductive film to form an electrode comprising a laminate structure of said first conductive layer with a third width and said second conductive layer with said second width.

34. A manufacturing method according to claim 33, after the formation of said third electrode, further comprising steps of:

forming a first interlayer insulating film for covering said third electrode;  
performing a first heat treatment for activating said impurity element in said

semiconductor layer;

forming a second interlayer insulating film for covering said first interlayer insulating film; and

performing a second heat treatment with a lower temperature than that in said first heat treatment.

35. A manufacturing method of a semiconductor device according to claim 9, wherein said semiconductor device is one selected from the group consisting of a video camera, a digital camera, a projector, a goggle type display, a car navigation system, a personal computer, a portable information terminal, a digital video disk player, and an electronic game device.

36. A manufacturing method of a semiconductor device according to claim 18, wherein said semiconductor device is one selected from the group consisting of a video camera, a digital camera, a projector, a goggle type display, a car navigation system, a personal computer, a portable information terminal, a digital video disk player, and an electronic game device.

37. A manufacturing method of a semiconductor device according to claim 19, wherein said semiconductor device is one selected from the group consisting of a video camera, a digital camera, a projector, a goggle type display, a car navigation system, a personal computer, a portable information terminal, a digital video disk player, and an electronic game device.

38. A manufacturing method of a semiconductor device according to claim 28, wherein said semiconductor device is one selected from the group consisting of a video camera, a digital camera, a projector, a goggle type display, a car navigation system, a personal computer, a

portable information terminal, a digital video disk player, and an electronic game device.

39. A manufacturing method of a semiconductor device according to claim 33, wherein said semiconductor device is one selected from the group consisting of a video camera, a digital camera, a projector, a goggle type display, a car navigation system, a personal computer, a portable information terminal, a digital video disk player, and an electronic game device.